JEFFERSON COUNTY ROAD STANDARDS
(ADOPTED)

August 9, 2005

Section I

WHEREAS, the Board of County Commissioners of Jefferson County are charged with the protection of the health, safety and welfare of the people of Jefferson County; and

WHEREAS, growth and development within Jefferson County results in new roadways, approaches and bridges being built to provide access to subdivision and lots for residential and commercial use; and

WHEREAS, these roadways, approaches, and bridges will be privately built and maintained for the public use, they must be constructed adequately for several types of transportation and safe for all users; and

WHEREAS a standard is also needed to which existing roads should be upgraded as time and resources permit;

NOW, THEREFORE, BE IT RESOLVED that the Board of County Commissioners of Jefferson County hereby adopts the following Street and Road design Standards:

STREETS AND ROADS

Road design standards can be complex. Developers and the public are encouraged to contact the Jefferson County Road Department for additional information or clarification.

A. Designs

1. The arrangement, type, extent, width, grade and location of all streets shall be considered in their relation to existing and planned streets, to topographical conditions and to public convenience and safety, and in their relation to the proposed uses of the land to be served by them.

2. Any and all public access road construction or reconstruction, in Jefferson County must be designed in accordance with the Jefferson County Road Standards and stamped by a Professional Engineer registered in the State of Montana.

   The public access road design plans are to be submitted to the County for approval after the Preliminary Plat application has been approved by the County and prior to any construction activities for the proposed project. At a minimum,

the plans shall contain the following information:

All road construction or reconstruction work must be certified by a licensed engineer as having been completed according to the Jefferson County Road Standards.

Plan View: Topographic information, right-of-way (R.O.W.) lines, horizontal alignment of roadway in relation to R.O.W., horizontal curve information (radius, length, Dc, PC, PT, PI, etc.), angle and point of intersection of connecting streets or roads, underground and overhead utilities, and stormwater drainage/detention facilities.

Profile View: Finished grade lines (centerline and one or both flow lines), vertical curve information (VPC, VPI, VPT, k value, curve length, etc.), location of underground utilities, and proposed culverts/ drainage structures.

Typical Section: R.O.W. width, street width, base course type and thickness, surface course type and thickness, subgrade compaction density, super elevation or crown slope, cut/fill slopes, borrow ditches, number of driving lanes, driving lane width and shoulder width.

3. Roads in low-density areas will meet the design specifications in Table 1.

4. Streets and roads in high density and commercial areas shall meet the design specifications in Table 3.

5. All streets or roads within a new development shall be dedicated to the public and owned and maintained by an approved property owners' association or individual property owners utilizing the roadways.

6. Any public access roads within a high density development or a development area with a minimum projected average daily traffic (ADT) of 400 or greater must be hard surfaced with an approved material such as double chip seal, minimum 10" of compacted cold asphalt millings with a chip seal, or a minimum 3" of hot asphalt paving. All public access roads shall be built with the minimum standard road base course material per these Road Standards.

7. Any development that proposes further development to an adjacent property or to an existing development that will access or utilize public access roads within the existing development will be required to meet the standard A6 above for all roads in the existing subdivision that have a resulting ADT of 400 or greater. All public access roads shall be built with the minimum standard road base course material per these Road Standards.

8. All roads for schools, churches, or other public facilities must be hard surfaced with a County approved material such as double chip seal, 10 inches of compacted cold asphalt millings with chip seal, or minimum 3" of hot asphalt paving, and be built with the minimum standard road base course material per these Road Standards.

9. All public access roads in or to any development for commercial or industrial use must be paved with a minimum of 3" compacted lift of hot asphalt paving with the minimum standard road base course material per these County Standards.

10. Residential driveways shall not have direct access to primary highways. For extreme circumstances, the Montana Department of Highways may issue a road approach permit.

11. Local streets shall be designed so as to discourage through traffic.

12. Specific requirements for depth of road base, aggregate materials, compaction, and type and depth of surface materials shall be as follows:

    a. Grading: All roads, streets and alleys shall be excavated or filled to within one tenth (0.1) of a foot of the grade established by an approved design plan.

    b. Sub-grades: Roadway sub-grades must be free of topsoil, sod, vegetation, organic matter, or other unsuitable soil foundation material which is not able to be adequately compacted. Sub-grades must be properly bladed, shaped, and rolled to the minimum specified compaction and subject to approval by the Jefferson County Authorized Representative.

    c. Base Course: Base course material placed immediately below a crushed top surfacing or asphalt paving shall meet the requirements of Section II of these Road Standards and the approved design.

    d. Surface Course: Aggregate surface course material shall consist of crushed gravel, stone, or other similar material consisting of hard, durable particles or fragments of stone, free of excess or flat, elongated, soft or disintegrated pieces, dirt or other deleterious matter. This is the surface course on gravel roads and streets. The material shall meet the requirements of Section II of these Road Standards and the approved design.

    e. Asphalt Paving: Asphalt shall consist of a bituminous hot plant mix

asphalt concrete consisting of mineral aggregate and asphalt material mixed at a central hot plant. The mineral aggregate and asphalt material shall meet the requirements of the appropriate sections of the latest addition of the Montana Public Works Standard Specifications (MPWSS).

f. Compaction efforts for subgrade and all aggregate base and surface courses on all public access road construction shall be a minimum of 93% of standard maximum density. Density testing shall be at the developer/contractor's expense and performed by an independent agency as approved by the Jefferson County's Authorized Representative.

g. Road Surface:

(1) For aggregate road surfacing, the entire roadway shall consist of a minimum 6" of ¾" minus crushed aggregate surface course material meeting the requirements of Section II of these Road Standards. The surfacing will be shaped, watered, and rolled to obtain the minimum specified compaction.

(2) Chip-seal road surfacing shall meet the requirements of Section III of these Road Standards placed over a minimum of 6" of ¾" minus crushed aggregate base course material properly bladed, shaped, watered, and rolled to the minimum specified compaction. Use of 1" minus or 1-1/2" minus crushed aggregate base course material may be used in an approved design.

(3) Asphalt surfacing shall consist of a minimum of 3" of compacted bituminous hot mix over a minimum 6" of an approved crushed aggregate base course material properly bladed, shaped, watered, and rolled to the minimum specified compaction. Use of 1" minus or 1-1/2" minus crushed aggregate base course material may be used in an approved design

(4) Road shape will consist of a crown in the middle of the road with not less than 3% cross slope. See Figure 1 and 2.

(5) Ditch in-slopes shall be between 3:1 and 6:1 with a maximum back-slope of 2:1. The ditch shall be a minimum of 1 foot in depth from the edge of subgrade elevation. See Figure 1 and 2

13. All new public access roads, including subdivisions, will be inspected for compliance with the approved design and these Road Standards by the Jefferson County Authorized Representative.

14. Whenever a subdivision abuts or contains an existing or proposed arterial roadway or major thoroughfare, the County Commission may require frontage roads.

15. Dead-end streets are discouraged. Where a future street extension is proposed, a cul-de-sac will be provided. Streets ending in cul-de-sacs will be no longer than 1,500 feet.

16. Half streets are prohibited except when essential to the development and where the County Commission is assured that it will be possible to require the dedication of the other half of the street when the adjoining property is subdivided. Whenever an existing half street is adjacent to a tract to be subdivided, the other half of the street shall be platted within such a tract.

17. Horizontal alignment of streets must ensure adequate sight distances. When street centerlines deflect more than five degrees, connection must be made by horizontal curves

18. Intersections. The following items apply to intersections:

    a. Streets must intersect at 90-degree angles, except when topography precludes, and in no case will the angle of intersection be less than 60 degrees to the centerline of roadway being intersected.

    b. Two streets meeting a third street from opposite sides must meet at the same point.

    c. No more than two streets may intersect at one point.

    d. Intersections of local streets with major arterial or highways must be kept to a minimum.

    e. Intersection design must provide acceptable visibility for traffic safety as dictated by the designed operating speeds on the individual roadways.

    f. When a new road intersects an existing principal arterial, minor arterial or local road at an inclining or declining angle greater than five percent, the new road approach will include a thirty-foot landing for sight distance and drainage. A culvert may be required.

    g. Hilltop intersections are prohibited, except where no alternatives exist. Intersections on local roads within 100 feet of a hilltop are prohibited. Intersections on arterial and collector roads within 200 feet of a hilltop are prohibited.

    h. Approach permits will be required for construction of approaches to

county roads prior to any construction.

19. Names of new streets aligned with existing streets will be named the same as those of the existing streets. Proposed street names will not duplicate or cause confusion with existing street names, in conformance with the county addressing system. The lettering on street or road identification markers will not be less than 3 inches high and not less than one half inch in stroke. All street markers shall be at least 5 feet but no more than 7 feet above ground level so as to be visible to emergency vehicles for a minimum distance of 100 feet.

20. Driveways to building sites must access ingress/egress roads at right angles and have a 12' minimum traffic lane with a 13' 6" height clearance. The ends of driveways exceeding 150' must have a turnaround area for emergency vehicles, which are designated as a cul-de-sac with minimum 50' driving surface radius.

The following are minimum design standards:

TABLE 1. ROAD DESIGN STANDARDS FOR LOW DENSITY AREAS

Low Density Areas:

An area in which the density of development is not more than one dwelling unit per acre exclusive of public roadways, and which is located one mile or more from a third class city, two miles or more from a second class city, or three miles or more from a first class city.

Minimum Design Standards	Principal Arterial	Minor Arterial	Local Road
1. Minimum right-of-way width	60 ft.	60 ft.	60 ft.
2. Minimum roadway width	24-28 ft.	24-28 ft.	24-28 ft.
3. Minimum curb radius or edge of pavement at intersection	30 ft.	25 ft.	25 ft.
4. Maximum grades			
a. flat and rolling terrain	6%	8%	8%
b. hilly terrain	8%	10%	10%
5. Minimum vertical curve	50 ft.	50 ft.	50 ft.
6. Minimum stopping sight distance	300 ft.	200 ft.	200 ft.
7. Curvature			
a. at design speed of road	40 mph	35 mph	35 mph

b. maximum curve	12.5°	23°	23°
c. minimum radius	460 ft.	249 ft.	249 ft.
8. Minimum intersection spacing	500 ft.	250 ft.	250 ft.
9. Minimum encroachment/approach spacing	100 ft.	100 ft.	100 ft.
10. Cul-de-sacs			
a. maximum length	1500 ft.	1500 ft.	1500 ft.
b. minimum outside right-of-way radius	60 ft.	60 ft.	60 ft.
c. minimum outside roadway radius	50 ft.	50 ft.	50 ft.

11. New bridges

All new bridge design must meet American Association of State Highway Transportation Officials (AASHTO)* and be designed by a professional engineer licensed in the State of Montana.

a. Curb to curb widths	36 ft.	26 ft.	24 ft.
b. AASHTO design	HS-20	HS-20	HS-20
c. Vertical clearance	14.5 ft.	14.5 ft.	14.5 ft.

(1) When parking on a bridge is permitted, eight feet of width will be added on each side.

(2) If guardrail installation is required or a shoulder is desired, add an additional two feet to each side of roadway.

(3) Bridge and roadway widths shown are minimums. Depending on Average Daily Traffic (ADT) count, the width should be increased.

(4) Flat and rolling terrain is land with a cross slope of less than 15%.

(5) Hilly terrain is land with a cross slope of 15% or greater.

(6) Horizontal curvature is based on a minimum super elevation of 0.08/ft.

(7) Width of the roadway surface on the bridge should match the width of the roadway system it connects to.

American Association of State Highway Transportation Officials may be used as a further

authority. Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specifications ranges outlined in these regulations. The standards presented should be considered "minimum standards," and may be increased if conditions warrant.

TABLE 2. MINIMUM ROADWAY WIDTHS

Roadway width according to Average Daily Traffic Count (ADT) and Topography

	ADT Count	Flat	Rolling	Mountainous
	0-400	24 ft.	24 ft.	24 ft.
	400-700	24 ft.	24 ft.	24 ft.
	700+	28 ft.	28 ft.	28 ft.
For design speeds in excess of 40 mph	Over 700	28 ft.	28 ft.	28 ft.

Note: ADT counts are available from the Montana Department of Transportation, Preconstruction Section, for most major collectors.

Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specification ranges outlined in these regulations. The standards presented should be considered "minimum standards", and may be increased if conditions warrant.

TABLE 3 STREET DESIGN STANDARDS FOR HIGH DENSITY, MAJOR AND COMMERCIAL AREAS

High Density Areas:

An area in which the density of development is greater than one dwelling unit per acre exclusive of public roadways, or which is located within one mile of a town or third class city, two miles of a second class city, or three miles of a first class city.

Minimum Design Standards	Principal Arterial	Minor Arterial	Local Road
1. Minimum right-of-way width	60 ft.	60 ft.	60 ft.
2. Minimum roadway width	24-28 ft.	24-28 ft.	24-28 ft
3. Minimum curb radius or edge			

of pavement at intersection		30 ft.	30 ft.	30 ft.
4. Maximum grades				
a. flat and rolling terrain		6%	8%	9%
b. hilly terrain		8%	9%	9%
5. Minimum intersection spacing		500 ft.	250 ft.	150 ft.
6. Minimum stopping sight distance		375 ft.	200 ft.	150 ft.
7. Curvature				
a.	at design speed of road	40 mph	35 mph	35 mph
b.	maximum curve	10°	19°	53°
c.	minimum radius	561 ft.	300 ft.	100 ft.
8. Minimum intersection spacing		500 ft.	250 ft.	150 ft.
9. Minimum encroachment/approach spacing		100 ft.	100 ft.	100 ft.
10. Cul-de-sacs				
a.	maximum length			1500 ft.
b.	minimum outside right-of-way radius			60 ft.
c.	minimum outside roadway radius			50 ft.

11. New bridges

All new bridge design must meet AASHTO and be designed by a professional engineer licensed in the State of Montana.

a.	Curb to curb widths	36 ft.	26 ft.	24 ft.
b.	AASHTO design	HS-20	HS-20	HS-20
c.	Vertical clearance	14.5 ft.	14.5 ft	14.5 ft.

(1) When parking on a bridge is permitted eight feet of width will be added on each side.

(2) If guardrail installation is required or a shoulder is desired, add an additional two feel to each side of roadway.

(3) Bridge and roadway widths shown are minimums. Depending on ADT count, the width could be increased.

(4) Flat and rolling terrain is land with a cross slope of less than 15%.

(5) Hilly terrain is land with a cross slope of 15% or greater.

(6) Horizontal curvature is based on a super elevation of 0.04/ft to 0.08/ft per foot.

(7) Width of the roadway surface on the bridge should match the width of the roadway system it connects to.

Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specification ranges outlined in these regulations. The standards presented should be considered "minimum standards", and may be increased if conditions warrant.

B. Definitions

1. Principal Arterial: a through road providing service to corridors with or travel densities greater than those served by minor arterial or local roads.

2. Minor Arterial: exhibiting lower travel distances and speeds than roads included on the arterial systems. Minor arterials are primarily for land use and are spaced at intervals consistent with population density to provide service to smaller county travel generators such as local roads.

3. Local Road: These are the remaining roads not classified under a higher system. The purpose of rural local roads is to provide land access and serve short distance travel.

C. Improvements

1. All roadway improvements including pavement, curbs, gutters, sidewalks, and drainage features shall be constructed in accordance with the specifications in these Road Standards, using materials approved by the Jefferson County Authorized Representative.

2. Roadway subgrades shall be free of topsoil, sod, vegetation, organic matter, or other unsuitable soil foundation material, which cannot be adequately compacted. Subgrades must be properly bladed, shaped, and rolled to the minimum specified compaction and subject to approval by the Jefferson County Authorized Representative.

3. Where access to a development will be by an easement across privately owned property, the developer must provide evidence that the necessary easement has been acquired and that the easement encompasses the nature and intensity of the use which will result from development.

4. Street or road signs and traffic control devices shall be placed at all intersections by the developer in accordance with the "Manual of Uniform Traffic Control Devices for Streets and Highways", available from the Montana Department of Transportation.

D. Mail Delivery

1. The developer shall provide an off-road area for mail delivery within the development as approved by the Jefferson County Authorized Representative.

2. All mailboxes are to be set a minimum of 12 feet off the edge of the county road driving surface in a location approved by the Jefferson County Authorized Representative.

E. Encroachment and Approaches

1. Any person who encroaches upon any county road right-of-way within Jefferson County must obtain a permit from the Jefferson County Road Department prior to any construction.

2. All approaches will enter the county road with a negative degree of slope not more than three percent (3%) for a minimum of 25 feet back from the edge of roadway of the county road. Variances to be approved by the County Commission on an individual basis, but can not exceed a positive slope of three percent (3%) for a minimum of 25 feet back from the edge of roadway of the county road. See attached Figure 1and 2.

3. All approaches shall be a minimum of 20 feet wide.

4. On paved roads the approaches should be paved for 15' from the shoulder of the road.

5. Any encroachment upon state owned and maintained roads must be authorized by the Montana Department of Transportation. The developer must obtain an approach permit and comply with state standards prior to Final Plat approval.

6. Failure to obtain a permit prior to any construction will result in a two hundred dollar ($200.00) late charge.

F. Drainage Features

1. The drainage features required for any surface run-off or run-off affecting the development shall meet the minimum standards of the Montana Department of Environmental Quality and all regulations adopted pursuant thereto, and are subject to the approval of the governing body. The intent of these regulations is to

assure that proper drainage facilities are provided for any runoff in addition to historic amounts, caused by the development of the property.

2. Public access roads shall be designed to ensure proper drainage.

3. Culverts shall be designed of an adequate size and spacing to pass the flow from a 25-year storm event. They shall be provided and installed by the developer where any proposed roadway intersects a drainage channel or feature. Minimum culvert size shall be 15” in diameter for driveways and 24” in diameter for public access roads. Culverts shall extend a minimum of 1’ beyond the toe of the roadway fill. The minimum fill cover over culverts shall be determined by the manufacturer’s recommendations for HS-20 loading.

4 Bridges shall be designed of an adequate size and elevation to pass the flow from a 100-year storm event. They shall be provided and installed by the developer where any proposed roadway intersects a drainage channel or feature of sufficient size and flow to warrant the use of a bridge. Bridges shall meet the design standards as specified in Tables 1 and 3 of these Road Standards and will not be narrower than the approaching roadways.

5. Drainage facilities shall be located in County road rights-of-way or in perpetual drainage easements of appropriate widths and are subject to approval by the Jefferson County Authorized Representative.

6. Drainage features shall not discharge into any sanitary sewer facility or any identified hazardous materials.

7. The grading and drainage features shall be designed in accordance with these Road Standards and applicable regulations, and stamped by a Professional Engineer registered in the State of Montana, except where a property is at the head of the drainage area and all natural historic drainage channels will be protected by perpetual easements as approved by the Jefferson County Authorized Representative.

8. Any and all maintenance, replacement, or repair of irrigation culverts and/or drainage structures within County road rights-of-way will be the responsibility of the appropriate water users.

Cattle Crossings and Gates

1. Cattle guards will be of new construction and designed for HS-20 loading.

2. Cattle guards will have a concrete footing of 10" width and 16" height.

3. Cattle guards will provide a minimum of twenty-four (24) feet of opening.

4. A wire or steel gate providing eighteen (18) feet of opening will be constructed adjacent to any and every cattle guard.

5. All encroachment or approach gates shall be located a minimum of 30 from the edge of the roadway and shall operate inward with a clear opening of 12 feet.

H. Variances:

1. Hardship

The County Commission may grant variance from the Jefferson County Road Standards when strict compliance would result in undue hardship and when it is not essential to the public welfare. Such variances shall not have the effect of nullifying the intent and purpose of these regulations. An innovative alternative proposal, which does not circumvent the purpose of these regulations, may be reason for granting of a variance by the County Commission. The County Commission shall not approve variances unless it makes findings based upon the evidence in each specific case that:

a. The granting of the variance will not be detrimental to the public health, safety, or general welfare.

b. Because of the particular physical surrounding, shape, or topographical conditions of the specific property involved, and undue hardship to the owner would result if the strict letter of the regulations were enforced.

c. The variance will not cause an increase in public costs.

2. Procedure

The developer shall include with the submission of the Preliminary Plat a written statement describing the requested variance and the facts of hardship upon which the request is based. The County Commission shall consider each requested variance at the public meeting or hearing on the Preliminary Plat.

3. Conditions

In granting variances, the Jefferson County Commission may impose such conditions as will in its' judgment substantially secure the objectives of these road standards.

SECTION II

Aggregates

A. Aggregate for Road Mix Bituminous Base

1. Aggregates for road mix bituminous base construction shall be crushed stone, crushed slag, or crushed or natural gravel meeting the quality requirements of table 703-3 unless shown otherwise in the approved specific project specifications.

2. The gradation shall be as described in the approved specific project specifications. When crushed gravel is used, not less than 50 percent by weight of the particles retained on the Number 4 sieve shall have at least one fractured face.

B. Aggregate for Base or Surface Courses

Aggregate materials shall conform to the requirements shown below unless shown otherwise in the approved specific project specifications.

1. Pit-Run Aggregate. Pit-run aggregates shall consist of native materials of a size and grading that can be taken directly from the source and placed on the road without crushing or screening. No gradation, other than a maximum size, will be required. The maximum size shall be as shown in the approved specific project specifications.

2. Grid-Rolled Aggregate. Grid-rolled aggregate shall consist of native materials of a quality that can be taken directly from the source, without crushing or screening, and broken down on the road by grid rolling. No gradation other than a maximum size will be required. The maximum size shall be as shown in the approved specific project specifications.

3. Screened Aggregate. Material shall consist of gravel, talus, rock, sand, shale, or other suitable material, and be reasonably hard and durable and reasonably free of organic material, mica, clay lumps, or other deleterious materials. The gradation requirements shall be as shown on the approved specific project specifications.

4. Crushed Aggregate. Aggregate for crushed base or surface courses shall be crushed stone, slag, or gravel meeting the requirements shown in table 703-3 unless shown otherwise in the approved specific project specifications.

Unless shown otherwise in the approved specific project specifications, the crushed aggregate gradation shall meet the requirements of table 703-4.

Aggregate shall be well graded from coarse to fine within the gradation band.

Table 703-3 – Crushed aggregate quality requirements for base or surface courses.

Description	AASHTO Test Method	Requirement	
		Base	Surfacing
approved specific project specifications	T 96	50 max.	50 max.
Durability Index, Coarse and Fire	T 210	35 min.	35 min.
Liquid Limit	T 89	25 max.	25 max.
Plasticity Index	T 90	6 max.	2-9 max.
Dust Ratio: % Passing No. 200	T 11	2/3 max.	2/3 max.
% Passing No. 30	T 27		
Sand Equivalent (alternate Method Number 2	T 176	35 mm.	--

When crushed gravel is used, at least 40 percent by weight of the particles retained on the Number 4 sieve shall be at least one fractured face. Naturally fractured faces may be included in the 50 percent requirement, provided the roughness and angularity produce strength characteristics equivalent to mechanically fractured faces.

Table II-1 **Specification for Crushed Surface Course**	
Table of Gradations **Percentage by weight passing square mesh sieve**	
Sieve Size	Grade 2
1 Inch Sieve	
¾ Inch Sieve	100%
½ Inch Sieve	
No. 4 Sieve	40-80%
No. 10 Sieve	25-60%
No. 200 Sieve	8-20%

Table II-2 **Specification for Crushed Base Course**
Table of Gradations

Percentages by Weight passing square mesh sieve			
Passing	1 ½" Minus	1" minus	3/4" Minus
2 Inch Sieve	--		
1 ½ Inch Sieve	100%		
1 Inch Sieve	--	100%	
¾ Inch Sieve	--	--	--
No. 4 Sieve	25-60%	40-70%	40-70%
No. 10 Sieve	--	25-55%	25-55%
No. 200 Sieve (not more than)	0-8%	2-10%	2-10%

Table II-3
Specification for Select Sub-Base Material

Table of Gradations Percentages by Weight passing square mesh sieve					
Passing	4" Minus	3" Minus	2 ½" Minus	2" Minus	1 ½" Minus
4 Inch Sieve	100%				
3 Inch Sieve	--	100%			
2 ½" Sieve	--	--	100%		
2 Inch Sieve	--	--	--	100%	
1 ½ Inch Sieve	--	--	--	--	100%
No. 4 Sieve	25-60%	25-60%	25-60%	25-60%	25-60%
No. 200 Sieve (not more than)	2-12%	2-12%	2-12%	2-12%	2-12%

SECTION III

Specifications for Chip Seal Surfacing and Cover

A. Material Requirements:

1. The chip seal surfacing design shall be a double bituminous surface treatment (double shot) consisting of a first application of 0.40 gallons per square yard of MC3000 or equal and 25 pounds of chips per square yard. The second application shall be .38 gallons per square yard of CRS2 or equal and 25 pounds of chips per square yard. Any variation from this spec must be an engineered design.

2. The specification for chips material

Table II-1 Specification for Chips Material	
Table of Gradations Percentage by weight passing square mesh sieve	
Sieve Size	Grade 4A
1/2 Inch Sieve	100%
3/8 Inch Sieve	100%
No. 4 Sieve	0-30%
No. 8 Sieve	0-15%
No. 200 Sieve	0-2%

2. The composite aggregate must not have adherent film or clay, vegetable matter, frozen lumps and other extraneous matters that prevents through coating with bituminous material. Bituminous material must remain adhered to the material upon contact with water. No combination of shale, clay, coal and soft particles can exceed 1.5 percent.

3. A wear factor not exceeding 30 percent at 500 revolutions.

4. A minimum of 70 percent by weight, of coarse aggregate for grade 4A must have at least one fractured face.

B. Construction Requirements:

1. Sampling, Testing and Acceptance.

   a. Furnish at least 2 aggregate sampling pans, each a minimum of 2 feet x 2 feet x 2 inches. Leg mount or support the pans to prevent disturbing the fresh asphalt when sampling.

   b. Take samples while spreading chips at locations randomly selected by the project manager. Place 2 sample pans on the roadway immediately ahead of the spreader between the spreader wheel paths. Stagger the pans 3 to 6 feet apart. Once the spreader passes, retrieve the sample pans and turn them over to the project manager for review.

   c. Replace or correct all asphalt removed or disturbed by the sampling and place cover aggregate over the sampling area at the specified rate.

2. Seasonal and Weather Limitations.

   a. Performance chip seal operations between June 1 and August 30.

   b. Do not perform chip seal work during the 48-hour period immediately

preceding a holiday or a holiday weekend.

c. Do not perform chip seal work if local weather forecasts includes a predicted temperature lower than 45° F (70 C) within 12 hours after the intended close of the work for the day.

d. Do not perform chip seal work if the local weather forecast includes a probability of precipitation greater than 45% within the intended schedule of operations for the day. Chip seal work may be suspended if impending adverse weather conditions occur in the vicinity of the work site.

e. Do not apply chip seal to damp or wet road surfaces.

f. Immediately stop chip seal work if the wind velocity affects the distribution of chips and oil or if current weather conditions prevent providing the specified results.

g. Stop chip seal work at least ½ hour before sunset.

3. Rolling Requirements.

a. Begin rolling immediately behind the spreader. Provide the number of rollers needed to cover the full width of the aggregate spread in one pass.

b Make at least 4 complete passes with each roller. Do not allow the speed to exceed 7 mph on the initial coverage. Additional rolling may be required.

4. Opening to Traffic.

a. Open the roadway to traffic within one week after the chip seal work is completed.

b. Broom within 48 hours of the completion of chip seal work. Broom in the early morning to minimize dust and reduce loosening or displacing of embedded aggregate. Provide water for dust control. Provide additional rolling if necessary.

c. If the chip seal fails to cure properly, or inclement weather interrupts the 48-hour curing period, continue traffic control as appropriate.

d. Correct surface irregularities affecting the ride quality at contractor's expense.

5. Traffic Control.

   a. Traffic control is the contractor's responsibility and must be in accordance with MUTCD standards.

   b. All Flaggers must have a current certification.